

Vocalisations and display behaviour of Javan Woodcock *Scolopax saturata* support its status as a distinct species

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Introduction

The woodcocks *Scolopax* are well known for their distinctive and vocal roding displays. These have been well described for Eurasian Woodcock *S. rusticola* (Cramp & Simmons 1983), American Woodcock *S. minor* (Keppie & Whiting 1994), New Guinea Woodcock *S. rosenbergii* (Mayr & Rand 1937) and, more recently, Bukidnon Woodcock *S. bukidnonensis* (Kennedy *et al.* 2001) and Moluccan Woodcock *S. rochussenii* (Cottee-Jones *et al.* 2013). Amami Woodcock *S. mira* apparently does not conduct roding displays (Brazil & Ikenaga 1987) and the display of Sulawesi Woodcock *S. celebensis* remains undocumented. The final species, Javan Woodcock *S. saturata*, was described by Bartels (1940) but this publication has since been overlooked and modern descriptions of the vocalisations and display of Javan Woodcock are lacking.

Javan Woodcock is distributed in montane habitats in Java and Sumatra; on Java, it has been recorded only in the west, specifically from Gns Salak, Gede-Pangrango, Papandayan, Ciremai, Slamet and Tangkuban Perahu (Bartels 1940, MacKinnon & Phillipps 1993). Ambiguity exists between published records of this woodcock's vocalisations and behaviour: MacKinnon & Phillipps (1993) listed two vocalisations from Java and Sumatra as a 'fast, endlessly repeated harsh cry *do-do-do-do-do*, also a singing *krrr-krrr-krrr*' while Bartels (1940), who collected 32 specimens of Javan Woodcock between 1902 and 1923, described one call as *oooooh-cherr-doddoddoddod...* Recently published vocalisations are of a single, repeated, nasal note (e.g. ML Audio 70472), apparently referable to the second call described by MacKinnon & Phillipps (1993). Likewise, several reports describe the woodcock calling while flying high over the forest at dusk (e.g. Andrew 1985) while Bartels (1940) described it vocalising while alighting and perched on a branch.

Vocal differentiation is an important component of speciation in birds and is often used in the assessment of species status between allopatric populations (Remsen 2005, Tobias *et al.* 2010). In the case of Javan Woodcock, several authors 'lump' Javan and

New Guinea Woodcocks together as one species, the Dusky or Rufous Woodcock (MacKinnon & Phillipps 1993, van Gils & Wiersma 1996, Clements 2007), whereas others treat them as separate species on the basis of subtle morphological differences and a substantial range separation (Kennedy *et al.* 2001 [followed by BirdLife International 2014], Dickinson & Remsen 2013). Here the display behaviour and vocalisations of Javan Woodcock are described and comments made on their implications for taxonomy.

Display behaviour

Between 19 and 26 September 2013, a single Javan Woodcock was observed displaying daily at dawn and dusk at Camp Bajuri, situated at 1,350 m on the south-west slope of Gn Salak, West Java (6.731°S 106.707°E). Habitat in the immediate vicinity of the camp was degraded montane forest, consisting of secondary growth mixed with high-canopy trees left after selective logging. Recordings of the vocalisations made by JCM with a Marantz PMD661 digital recorder and Sennheiser MKH70 microphone are archived at the Macaulay Library of Natural Sounds, Ithaca, New York (macaulaylibrary.org: ML Audio 181892–181896). Dawn displays began at 05h15 and dusk displays at 17h50, with display times consistent throughout the duration of the fieldwork. The Javan Woodcock's activity coincided with the vocalisation time of Salvadori's Nightjar *Caprimulgus pulchellus* and occurred when too dark for diurnal passerine species but too light for nocturnal species such as Javan Frogmouth *Batrachostomus javensis*.

During display the bird flew through the forest canopy to perch on a horizontal branch in the upper levels of a mid-storey tree, about 10 m above the ground. After calling once or twice from this perch (at intervals of 40 seconds), the woodcock flew to another tree about 50 m away and called again. The bird was consistent in its choice of perch and flight path. On all eight mornings of the study, the woodcock flew through the same gap between trees before calling from its selected perch. A different, nearby tree and perch were used during both of the two observed evening displays.

Figure 1. Sonagram of the display song of Javan Woodcock *Scolopax saturata* recorded during the dusk display at Gn Salak, West Java, 23 September 2013. Sonagram produced using RavenLite software (Cornell University, Ithaca, NY); original recording archived at the Macaulay Library of Natural Sounds (ML Audio 181893).



Vocalisations

The woodcock was only observed vocalising while perched. The song consisted of a loud three-part vocalisation beginning with a short, low growl *grrrr* (1.2 seconds), followed by an explosive sneeze *churr!* (0.5 second) and a drawn-out staccato grunt *do-do-do-do-do-do-do-do-do* (7 seconds). Analysis of sonagrams (Figure 1) indicates that the first motif is composed of a three-part harmonic with sound bands at 0.35 kHz, 0.7 kHz and 1.0 kHz, while the second is higher and descending (3.3 kHz to 2.5 kHz) and the third consists of fast bursts of six notes at a rate of one note/0.005 second, followed by a pause of about 0.02 second, then two notes at the same rate followed by another pause of 0.02 second on a repeating cycle. These notes are audible to the human ear at a rate of about 23 notes/second and have minimum and maximum frequencies of 0.08 kHz and 2 kHz, with the peak frequency occurring at 0.8 kHz.

Discussion

The display behaviour of the Javan Woodcock is similar to other woodcock species in its timing relative to other bird species and in the consistency with which it conducts dawn and dusk displays. The use of a tree perch to sing rather than calling in flight is apparently unique amongst known woodcock displays and the present observations concur with the descriptions made by Bartels (1940), in contrast with those of subsequent observers. In terms of vocalisations, these observations also support those published by Bartels (1940) and add to the description in MacKinnon & Phillipps (1993) of the *do-do-do-do* call. The existence of both a lower 'grunt' vocalisation and a higher-pitched call is similar to other woodcock species, specifically Eurasian, Bukidnon and New Guinea Woodcocks (Kennedy *et al.* 2001). It is noteworthy, however, that the high-pitched *krrrr* call was not recorded during the fieldwork, and existing recordings of that call do not include the *do-do-do* vocalisations. These two calls could serve different functions or be used at different times of year. Alternatively, the *krrrr* vocalisation might not be made by the woodcock at all, a possibility supported by the fact that it was not described by Bartels despite his long experience of the species.

Kennedy *et al.* (2001) provided a description and sonagrams of the vocalisations of Eurasian, Bukidnon and New Guinea Woodcocks, and these recordings offer the opportunity to compare analogous vocalisations from Java. As in those three species, Javan Woodcock has a low-pitched grunt phase with its main energy at about 1 kHz and a banded pattern composed of simple, rapidly repeated elements. However, substantial differences in the song are apparent. Relative to the song of New Guinea Woodcock, notable differences are: (a) the three-part structure of the Javan song (New Guinea Woodcock shows only two distinct motifs), (b) the presence of the introductory harmonic, (c) the repetition without pauses and the overall longer duration (5–7 seconds rather than 0.2 second) of the rapidly repeating third motif, and (d) the lack of gaps between each of the three motifs. Although the limited sample size restricts the potential for statistical comparison, the vocalisations are clearly distinct and fully diagnosable. Additionally, one recording available for this taxon from Sumatra ([www.xeno-canto.org: XC56931](http://www.xeno-canto.org/XC56931)) shows the same three motifs, of similar length and speed, as the Javan recordings. The substantial vocal differences between the song of Javan and New Guinea Woodcocks, as well as the previously noted plumage differences (Kennedy *et al.* 2001), support the conclusion that the Javan and New Guinea Woodcocks are best treated as separate species.

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